SCOPE OF WORK FOR THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY AT THE CHEVRON CHEMICAL COMPANY, ORLANDO SITE

INTRODUCTION

The purpose of this Remedial Investigation/Feasibility Study (RI/FS) is to investigate the nature and extent of groundwater contamination at the Orange Blossom Trail Site (the "Site"), assess the nature and extent of soil contamination in the adjoining trailer park and in areas of off-site drainage, assess the current and potential risk to public health, welfare, and the environment, and to develop and evaluate potential Remedial Action Alternatives. The RI and FS are interactive and shall be conducted concurrently so that the data collected in the RI influences the development of Remedial Action Alternatives in the FS, which in turn affects the data needs and the scope of Treatability Studies.

A Removal Action was conducted at the Site from December 1991 to September 1992 to remove over 22,000 tons of contaminated soil. The Removal Action eliminated the primary source areas which posed a potential risk to human health and the environment. As a result of the work done prior to and during the Removal Action, the soils on the Site have been extensively characterized, and pre-removal groundwater conditions established. The data are presented in the Removal Action Report (Brown and Caldwell Consultants 1992), and are incorporated herein by reference.

The Respondents shall conduct the RI/FS and produce an RI/FS Report that is in accordance with this Scope of Work, the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, (Interim Final) (U.S. EPA Office of Emergency and Remedial Response, October 1988) (the "RI/FS Guidance"), the National Oil and Hazardous Substances Pollution Contingency Plan (March 8, 1990) and other guidance used by EPA in conducting an RI/FS (a list of the primary guidances is attached), as well as any additional requirements in the Administrative Order. The RI/FS Guidance describes the report format and the required report content. Pertinent RI/FS Guidance section numbers are denoted in parenthesis throughout this Scope of Work. The Respondents shall furnish all necessary personnel, materials, and services needed, or incidental to, performing the RI/FS, except as otherwise specified in the Consent Order.

At the completion of the RI/FS, EPA shall be responsible for the selection of a remedy to be implemented for the Site. EPA will document this selection of a remedy in a Record of Decision (ROD). The Remedial Action Alternative selected by EPA will meet the cleanup standards specified in §121 of SARA. That is, the selected remedial action will be protective of human health and the environment, will be cost-effective, will utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable, will be in compliance with, or include a waiver of, applicable or relevant and appropriate requirements (ARARs) of other laws or regulations, and will address the statutory preference for on-site treatment which permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants as a principal element. The Final RI/FS Report, as adopted by EPA, and the Baseline Risk Assessment will, with the remainder of the Administrative Record, form the basis for the selection of the remedy to be implemented for the Site and will provide the information necessary to support the development of the ROD.

As specified in §104(a)(1) of CERCLA, as amended by SARA, EPA must provide oversight of the Respondents' activities throughout the RI/FS. The Respondents shall support EPA's initiation and conduct of activities related to the implementation of oversight activities. However, the primary responsibility for conducting an adequate RI/FS to enable and support the selection of a remedy shall lie with the Respondents. EPA review and approval of deliverables is a tool to assist this process and to satisfy, in part, EPA's responsibility to provide effective protection of public health,

welfare, and the environment. EPA approval of a task or deliverable shall not be construed as a guarantee as to the ultimate adequacy of such task or deliverable. A summary of the major deliverables that Respondents shall submit for the RI/FS is attached (Attachment A). In addition, a general schedule of RI/FS activities is attached (Attachment B).

TASK 1 - SCOPING (RI/FS Guidance, Chapter 2)

Scoping is the initial planning process of the RI/FS and has been initiated by EPA and the Respondent. Scoping will be continued, repeated as necessary, and refined throughout the RI/FS process. In addition to developing the Site Objectives of the RI/FS, EPA has developed a Site Management Strategy. Consistent with the Site Management Strategy, the specific project scope has been planned by the Respondents and EPA, and is documented herein. Because the work required to perform an RI/FS may not be fully known at the onset, and may be phased in accordance with a Site's complexity and the amount of available information, it may be necessary to modify the Scope of Work during the RI/FS to satisfy the objectives of the study.

The Site Objectives for the Orange Blossom Trail Site have been determined preliminarily, based on available information, to be the following:

1. Review of relevant guidance (see attached references) to understand the remedial process. This information shall be used in performing the RI/FS and preparing all deliverables under this SOW.

2. Identification of all Federal and State applicable or relevant and appropriate requirements (ARARs).

3. Determination of the nature and lateral and vertical extent of contamination (waste types, concentrations and distributions) for all affected media. Previous investigations identified contamination of the onsite soils by chlorinated pesticides (e.g. chlordane, DDT, and lindane) chlorinated organic compounds, petroleum hydrocarbons and metals. The contaminated soil on the site was identified as the primary source of contamination. This source area was characterized and removed from the site during the Removal Action. Therefore, the RI Report will document that the potential for human and/or ecological contact with the source has been eliminated. To the extent necessary, additional soil samples may be required for this purpose. The Removal Action activities are summarized in the Removal Action Report (BCC, 1992). Other potential sources of contamination were also removed during the Removal Action, including drums of potential contaminants, above ground tanks and septic tanks.

The primary contminant migration pathway prior to the Removal Action was stormwater infiltration through the contaminated soil and into the groundwater. Groundwater quality data collected prior to the Removal Action identified lindane, xylene and the chlorobenzenes as the primary groundwater contaminants. Migration of contminants as windblown particulates or as volitile emmisions has been eliminated by removal of contaminated surficial soils during the Removal Action.

The surficial soils which underlie the site are predominantly well drained quartz sand. Prior to the Removal Action, stormwater flow within the site was controlled by a berm, ditch and infiltration area along and within the northern boundary of the site, and a ditch along the railroad track bordering the southern side of the site. Runoff from the previously paved area on the eastern quarter of the site was routed to a storm-sewer system. Since pre-Removal Action stormwater runoff was controlled by site features which ensured percolation of stormwater on-site, stormwater

runoff is not considered to be a contaminant migration pathway. Site modification by the Removal Action controls stormwater runoff to contain it onsite. Potential source areas (i.e. contaminated soils) were eliminated during the Removal Action. Off-site soil characterization will be conducted in the area north of the site to confirm that stormwater runoff was not a historical pathway for contaminant migration.

Contaminant migration in the groundwater to potential surface water receptors is unlikely due to the nature of the contaminants and the distance from the site to the nearest surface water body, Lake Fareview. The lake is over 1000 feet to the northeast of the site, and preliminary data suggest that the groundwater contamination has not and will not enter Lake Fairview. However, if groundwater data collected during the Remedial Investigation identifies the potential for contaminant migration into Lake Fairview, the lake will be assessed to determine the nature and extent of potential contaminant migration into the lake.

4. A well survey was performed during the pre-Removal Action activities and no drinking water supply sources were identified near the site. The results of the additional groundwater investigation which will be conducted during this Remedial Investigation will be used to identify the need for and extent of addtional domestic well survey activities.

5. Performance of bench or pilot Treatability Studies as necessary.

6. Detailed analysis of Remedial Action Alternatives.

The Site Management Strategy for the Orange Blossom Trail Site includes the following:

1. A complete investigation of the Site including any and all off-site contamination which may have been caused by contaminants originating from the Site. Data collected prior to and during the Removal Action will be utilized to the fullest extent possible.

2. Use of the RI to identify any other Potentially Responsible Parties that may be involved.

3. Evaluation of the Site as a whole, i.e., it is not anticipated at this time that the Site will be partitioned into separate operable units. It is anticipated that only one Record of Decision (ROD) will be prepared for the Site.

4. An expectation that no additional interim remedial measures will be required.

5. EPA oversight of the Respondents' conduct of the work (i.e., the RI/FS and any response action) to ensure compliance with applicable laws, regulations and guidances and to ensure that the work proceeds in a timely fashion.

6. EPA preparation of the Baseline Risk Assessment. Data collected prior to and during the Removal Action will be utilized to the fullest extent possible. The Baseline Risk Assessment will be based on current site conditions.

7. EPA management of the Remedy Selection and Record of Decision phase with input from State Agencies, Natural Resource Trustees and the Public (including the Respondents).

When scoping the specific aspects of a project, the Respondents must meet with EPA to discuss all project planning decisions and special concerns associated with the Site. The following activities have been performed by the Respondents as a function of the project planning process.

Activity 1.0 Site Background and Existing Data (2.2; 2.2.2; 2.2.6; 2.2.7)

The Respondent gathered and analyzed the existing background information and data regarding the Site and has presented the information in the Contamination Assessment Report (Brown and Caldwell Consultants, 1990), Removal Action Plan (Brown and Caldwell Consultants, 1991), Sampling and Analysis Plan (Brown and Caldwell Consultants, 1991), Quality Assurance Project Plan (Brown and Caldwell Consultants, 1991), Site Health and Safety Plan (Brown and Caldwell Consultants, 1991) and the Removal Action Report (Brown and Caldwell Consultants, 1992) which have been approved by EPA and are part of the Administrative Record. Current site conditions, including contaminant levels in soils and groundwater and monitoring well locations are included in the Removal Action Report. A list of preliminary groundwater ARARs is included in the Removal Action Report, as well as in Appendix D, herein. Preliminary Data Quality Objectives for the site are included in the Sampling and Analysis Plan (BCC 1991) and will be updated in the Sampling and Analysis Plan Amendment.

The source areas on the site were eliminated during the Removal Action. The primary contaminant migration pathway to be investigated during the Remedial Investigation is the surficial aquifer beneath and downgradient of the site. The confining unit below the surficial aquifer will also be assessed to determine the potential for downward migration of contaminants into the Floridan aquifer system.

The potential for historic contaminant migration through overland flow of stormwater to the adjacent property to the north will be assessed though soil sampling and analysis. Background soil samples will also be collected to provide background soil quality data for the Baseline Risk Assessment.

If the groundwater investigation demonstrates the potential for contaminant migration into Lake Fairview, this Scope of Work will be amended to include assessment of the sediment and water quality in lake Fairview.

Activity 2.0 Project Planning (2.2)

The Scope of Work for the Remedial Investigastion and the Feasibility Study has been developed based on data previously collected during the Removal Action, and is presented as Tasks 2, 3, 4, and 5. Specific required deliverables are described in Task 1, Activity 3.0.

Remedial Action Objectives and Alternatives (2.2.3)

Data collected during the Removal Action (summarized above) confirms that the source of contamination on the site has been eliminated. The Remedial Action Objective for the RI/FS is to control the migration of contaminants in the groundwater (the primary migration pathway) or restore the aquifer to protect human health and the environment. Additionally, the waters of the shallow unnamed aquifer are classified as a Class II aquifer and a potential source of drinking water. Groundwater action levels in Class II aquifers are MCLGs, or where these are zero, MCLs, or for constituents from which MCLGs or MCLs have not been promulgated, other health based numbers.

Remedial Action Alternatives were selected to address the Remedial Action objective. The site contaminants have been identified, and possible treatment technologies addressed during the Removal Action. Proven technologies for the treatment of the combination of chlorinated pesticides, chlorinated organics, and petroleum hydrocarbons are limited, and therefore, the necessity for alternatives screening has been eliminated. Two primary approached to the control of

contaminant migration in the groundwater are identified as In-situ Alternatives and Extraction/Treatment Alternatives. Several alternatives are identified for each approach to address the range of technologies available for the primary site contaminants. The application of standard treatment technologies (i.e., air stripping and activated carbon filtration) will be evaluated utilizing data collected during the Removal Action, which incorporated these technologies. Treatability studies will be conducted to support the detailed evaluation of various alternatives which may be effective for the treatment of the groundwater contaminants identified through Site Characterization activities. A combination of alternatives may also be evaluated, as innovative technologies, based on results of the Site Characterization.

The following Remedial Action Alternatives will be evaluated:

A. In Situ Alternatives:

1) No Action
2) Bioremediation
3) Containment

B. Extraction/Treatment Alternatives

1) Activated Carbon
2) UV/Chemical Oxidizer
3) Biological

Activity 2.1 Document the Need for Treatability Studies (2.2.4)

Treatability Studies will be required to assess the need for and effectiveness of groundwater treatment technologies. A Treatability Study Technical Memorandum shall be prepared and submitted following Site Characterization.

Activity 2.2 Begin Preliminary Identification of Potential ARARs (2.2.5)

Site ARARs were initially identified in the Removal Action Report (Brown and Caldwell Consultants, 1992) and presented herein in Attachment C. ARAR identification shall continue as conditions and contaminants at the Site and Remedial Action Alternatives are better defined.

Activity 3.0. Scoping Deliverables (2.3)

The Respondents shall submit a Sampling and Analysis Plan Amendment (SAPA), Quality Assurance Plan Amendment (QAPPA), and a Health and Safety Plan Amendment. The Sampling and Analysis Plan Amendment and Quality Assurance Plan Amendment must be reviewed and approved and the Health and Safety Plan Amendment reviewed by EPA prior to the initiation of fieldactivities. Plan amendments will be prepared in accordance with applicable EPA guidance documents, and will incorporate procedures outlined in the USEPA Region IV, Standard Operating Procedures and Quality Assurance Manual (SOP, 1991)

Activity 3.1 Sampling and Analysis Plan (2.3.2)

The Respondents shall prepare a Sampling and Analysis Plan Amendment (SAPA) to ensure that sample collection and analytical activities are conducted in accordance with

technically acceptable protocols and that the data generated will meet the DQOs established. The SAPA provides a mechanism for planning field activities and is submitted as an amendment to the Sampling and Analytical Plan previously approved by EPA (Brown and Caldwell Consultants, 1991).

The SAPA shall define the sampling and data-gathering approach that shall be used on the project. It shall include sampling objectives, sample location (horizontal and vertical) and frequency.

Activity 3.2 Quality Assurance Project Plan

The Respondent shall prepare a Quality Assurance Project Plan Amendment (QAPPA). The QAPPA shall describe the project objectives and organization, and functional activities. In addition, the QAPPA shall address personnel qualifications, and analytical procedures. These procedures must be consistent with the Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual. Field personnel shall be available for EPA QA/QC training and orientation, as required.

The Respondent will utilize PACE Inc. as the analytical laboratory. PACE Inc. has been approved and audited by EPA for work on this site.

Activity 3.3 Health and Safety Plan (2.3.3)

A Health and Safety Plan Amendment shall be prepared to amend the Site Health and Safety Plan approved for the site by EPA (Brown and Caldwell Consultants 1991).

TASK 2 - COMMUNITY RELATIONS (2.3.4)

The development and implementation of community relations activities are the responsibility of EPA. The critical community relations planning steps performed by EPA include conducting community interviews and developing a community relations plan. Although implementation of the community relations plan is the responsibility of EPA, the Respondent maybe requested to assist by providing information regarding the history of the Site and participating in public meetings. The extent of the Respondent's involvement in community relationsactivities is left to the discretion of EPA. The Respondent's community relations responsibilities, if any, shall be specified in the community relations plan. All community relations activities conducted by Respondents shall be subject to oversight by EPA.

EPA shall prepare two or more Baseline Risk Assessment memoranda which will summarize the toxicity assessment and exposure assessment components of the Baseline Risk Assessment. EPA shall make these memoranda available to all interested parties for comment by placing them in the information repository EPA shall establish for the Site and placing them in the Administrative Record. EPA, however, is not required to formally respond to comments except during the formal comment period which occurs after a Proposed Plan is issued.

TASK 3 - SITE CHARACTERIZATION (RI/FS Guidance, Chapter 3)

The overall objective of Site Characterization is to determine the extent of migration of the groundwater contamination, the volume of the plume, and the physical and chemical characteristics of the plume. This will provide for a comprehensive understanding of the nature and extent of contamination at the Site. Using this information, contaminant fate and transport mechanisms shall

be evaluated, and future contaminant migration and/or recovery scenarios projected.
During this phase of the RI/FS, the SAPA, QAPPA, and Health and Safety Plan Amendment shall be implemented. Field data shall be collected and analyzed to provide the information required to accomplish the objectives of the study. The Respondents shall notify EPA at least two weeks in advance of the field work regarding the planned dates for field activities, including installation and sampling of monitoring wells, installation and calibration of equipment and pump tests. Activities are often iterative and, to satisfy the objectives of the RI/FS, it may be necessary for the Respondents to supplement the work specified in the initial Scope of Work (SOW). In addition to the deliverables below, the Respondents shall provide a monthly progress report and participate in meetings at major points in the RI/FS.

The field investigation (3.2) includes the gathering of data to define physical characteristics, and the nature and extent of contamination at the Site. These activities shall be performed by the Respondents in accordance with the Scope of Work and SAPA. At a minimum, this shall include the following activities:

Activity 1.0 Implementing and Documenting Field Support Activities

The Respondent shall initiate field support activities following approval of the SOW and SAPA. Field support activities include obtaining access to properties adjacent to the site, scheduling subcontractors (drilling, surveying, and laboratory services), and underground utilities clearance. The Respondent will notify EPA at least two weeks prior to initiating field support activities so that EPA may adequately schedule oversight tasks. The Respondent shall also notify EPA in writing upon completion of field support activities.

Activity 2.0 Investigating and Defining Physical and Biological Characteristics

An accelerated approach to data collection has been developed based on the data collected during the Removal Action. These data and the conceptual site modeling have identified groundwater as the primary contaminant migration pathway. Data collection efforts will focus on characterizing the chemical properties of the groundwater plume, and the contaminant fate and transport mechanisms. To expedite the data collection effort, the existing SAP (BCC, 1991), QAPP (BCC, 1991) and HSP (BCC, 1991) will be amended to eliminate a lengthly document preparation schedule. Groundwater modeling will be used, in combination with existing geochemical and aquifer characteristics data, to predict the extent of the plume and minimize the need for additional phases of data collection. The Respondent will collect additional data on the physical and biological characteristics of the site and its surrounding areas. This information will be obtained in accordance with the activities described below and in accordance with procedures outlined in the plan amendments and the SOP (EPA Region IV, 1991).

Activity 2.1 Sampling and Analysis of Existing Monitor Wells

Respondent will sample 12 monitor wells which were constructed prior to and in conjunction with the Removal Action. The 12 remaining monitor wells are shown on Figure 1. The monitor wells will be sampled in accordance with protocols and procedures presented in the SAP (BCC 1992). Quality assurance samples will include 1 duplicate sample; 1 field blank; 1 equipment blank; and 1 trip blank per sample cooler. The samples will be analyzed using EPA Methods 601 and 602 for volatile organic compounds; EPA Method 625 for semivolitile organic compounds; EPA Method 608 for chlorinated pesticides; EPA Method 614 for organophosphate pesticides; EPA Method 206.2 for chromium; EPA Method 200.7 for arsenic and

EPA Method 239.2 for lead. The proposed analytical methods provide the detection limits necessary for comparison of the analytical results with federal and state maximum contaminant levels (MCLs) for drinking water, which are preliminary ARARs for this project.

Prior to sampling, the water level elevation will be measured in each well to facilitate calculation of the direction and rate of groundwater flow.

Activity 2.2 Initial Data Evaluation

The data derived from Activity 2.1 will be used to determine the placement of additional monitor wells, and to identify the contaminants of concern. Using the analytical results, groundwater flow data, and the geochemical evaluation conducted during the Removal Action, Respondent will develop a computer simulation to determine the probable maximum areal extent of various contaminants of concern. The computer simulation will be based on the SUTRA or similar computer model. The site specific model will also be utilized during the Feasibility Study to evaluate groundwater recovery scenarios.

The base model will be developed to simulate a pre-Removal Action contaminant release scenario, with removal of the source area for prediction of groundwater recovery scenarios. The results of the simulation will be used to recommend the optimum locations for placement of additional monitor wells. The results of the simulation and the recommended well locations will be presented to EPA and discussed prior to final well location selection.

Activity 2.3 Additional Monitor Well Construction, Sampling and Sample Analysis

It is anticipated that 18 additional monitor wells will be constructed to include the following (Each cluster will include one (1) shallow well to intersect the groundwater table and one (1) intermediate depth well to intersect the base of the surficial aquifer):

Background/Upgradient Wells - Two (2) well clusters (4 wells) will be constructed along the south boundary of the site.

Compliance Monitor Wells - Two (2) well clusters (4 wells) will be constructed along the north boundary of the site. One cluster (2 wells) will be constructed at the northwest corner of the site, and one cluster (2 wells) will be constructed at the northeast corner of the site, approximately 50-feet north of monitor well (MW) P.

Downgradient Monitor Wells - Four (4) additional monitor well clusters (8 wells) will be constructed downgradient (north and east) of the MW-1 and MW-2 clusters to determine the downgradient extent of the contaminant plume.

Hawthorn Formation Monitor Wells - Two (2) deep monitor wells will be constructed into the first water producing zone of the Hawthorn formation. These wells will be constructed with telescoping casing to prevent the downward migration of contaminants into the deeper water producing strata. One deep well will be constructed in the central excavation/lagoon area to evaluate the most probable area of high contaminant concentration. The second deep well will be

constructed adjacent to the MW-1 cluster to evaluate downgradient migration and vertical differences in the potentiometric surface.

All new monitor wells will be constructed of 2-inch diameter stainless steel casing and screen. The shallow monitor wells will be constructed using hollow-stem auger drilling methods. The intermediate and deep monitor wells will be constructed using reverse-air rotary or mud rotary methods. The intermediate depth monitor wells will be constructed through 6 to 8 inch diameter steel surface casing, installed 10-feet into the confining layer and pressure grouted into place. If the first producing zone is deeper than 100-feet BLS, a second string of steel casing (6-inch diameter) may be installed to ensure that contaminants are not introduced into the deeper strata during drilling. The use of a second string of casing will be dependent on the physical nature of the confining strata, which is fractured in portions of Orange County. Pilot holes will be constructed to determine the optimum depth for each string of casing.

The new monitor wells and existing monitor wells will be sampled, and samples analyzed for the contaminants of concern. The contaminants of concern will be identified based on the results of Activity 2.2. The downgradient monitor well samples will also be analyzed for biological/bacterial activity for further geochemical assessment.

Activity 2.4 Monitor Well Surveying

Upon completion of monitor well construction, the elevation of the top-of-casing for each monitor well will be measured by a surveyor registered in the State of Florida. A base map will be prepared to depict the area of well installation, to include existing wells, property boundaries, drainage features, and major structures.

Activity 2.5 Permeability Testing

Following collection of groundwater samples, permeability (slug) testing will be conducted on four well clusters (eight wells). The selected wells will form a southwest to northeast cross-section across the site and to the furthest downgradient extent. Only stainless steel wells will be tested, since these wells are generally constructed to be more hydrologically efficient.

Activity 2.6 Soil Sampling

At least twelve (12) surficial soil samples (from 0 to 3 inches below land surface) will be collected from the trailer park property located adjacent to the north boundary of the site. Additional soil samples, from a depth of 12 inches, will be collected at three (3) or 20%, whichever is greater, of the sampling locations. These samples will be used to determine whether historical stormwater runoff from the site was a contaminant migration pathway. In addition, three (3) background surficial soil samples will be collected from similar areas outside of the potential influence of the site to provide background soil quality data for the Baseline Risk Assessment. Soil samples will be analyzed for chlorinated pesticides (EPA Method 8080), volatile organic compounds (EPA Method 8260), semivolitile organic compounds (EPA Method 8270), arsenic (EPA Method 200.7), chromium (EPA Method 206.2) and lead (EPA method 239.2).

Activity 3.0 Data Analyses (3.4)

Evaluate Site Characteristics (3.4.1)

The Respondents will analyze and evaluate the data to describe; (1) physical and biological characteristics of the Site, (2) nature and extent of contamination, and (3) contaminant fate and transport. The information on physical and biological characteristics and nature and extent of contamination will be used in the analysis of contaminant fate and transport. The evaluation will include the actual magnitude of releases from the sources and lateral and vertical spread of contamination as well as mobility and persistence of contaminants. Groundwater modeling will be utilized, as described in activity 2.2. All data and programming, including any proprietary programs, shall be made available to EPA together with a sensitivity analysis. All models shall be approved by EPA prior to their use. The RI data will be presented in a computer disk format utilizing Lotus 1-2-3. Respondent will then collect data identified by EPA as necessary to fill data gaps that EPA determines are present. Also, this evaluation will provide any information relevant to characteristics for the Site necessary for evaluation of the need for remedial action in the Baseline Risk Assessment, the development and evaluation of Remedial Action Alternatives, and the refinement and identification of ARARs. Analyses of data collected for Site Characterization shall meet the DQOs developed in the QAPP (Brown and Caldwell Consultants, 1991).

Activity 4.0 Data Management Procedures (3.5)

The Respondents will consistently document the quality and validity of field and laboratory data compiled during the RI. At a minimum, this will include the following activities:

Activity 4.1 Documenting Field Activities (3.5.1)

Information gathered during characterization of the Site shall be consistently documented and adequately recorded by the Respondents in well maintained field logs and laboratory reports. The method(s) of documentation are specified in the SAP (Brown and Caldwell Consultants, 1991). Field logs will be utilized to document observations, calibrations, measurements, and significant events that have occurred during field activities. Laboratory reports must document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and/or data deficiencies.

Activity 4.2 Maintaining Sample Management and Tracking (3.5.2; 3.5.3)

The Respondent will maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data are reported and utilized in the development and evaluation of the Baseline Risk Assessment and Remedial Action Alternatives. Analytical results developed under the Scope of Work shall not be included in any characterization reports for the Site unless accompanied by or cross-referenced to a corresponding QA/QC report. In addition, the Respondent will establish a data security system to safeguard chain-of-custody forms and other project records to prevent loss, damage, or alteration of project documentation.

Activity 5.0 Site Characterization Deliverables (3.7)

The Respondent shall prepare the Remedial Investigation and Feasibility Study Reports.

Activity 5.1 Remedial Investigation (RI) Report (3.7.3)

The Respondent will prepare and submit results of the Remedial Investigation in the Draft RI Report to EPA for review and approval. This report will summarize results of field activities to characterize the Site, sources of contamination, nature and extent of contamination, and the fate and transport of contaminants. The Respondent will utilize the RI/FS Guidance outline of the RI report format and contents. Following comment by EPA, the Respondents shall prepare a Final RI Report which satisfactorily addresses EPA's comments.

TASK 4 - TREATABILITY STUDIES (RI/FS Guidance, Chapter 5)

Treatability Studies will be performed by the Respondents to assist in the detailed analysis of alternatives. If applicable, study results and operating conditions will later be used in the detailed design of the selected remedial technology. The following activities will be performed by the Respondent.

Activity 1.0 Determination of Candidate Technologies and the Need for Treatability Studies (5.2; 5.4)

The Respondents will identify in a Treatability Study Scope of Work Amendment, subject to EPA review and comment, candidate technologies for a Treatability Studies program during project planning (Task 1). The listing of candidate technologies will cover the range of technologies required for alternatives analysis. The specific data requirements for the Treatability Studies program will be determined and refined during Site Characterization and the development of Remedial Action Alternatives (Tasks 3 and 5, respectively).

Activity 2.0 Conduct Literature Survey and Determine the Need for Treatability Studies (5.2)

The Respondent will conduct a literature survey to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance (O&M) requirements, and implementability of candidate technologies. If practical candidate technologies have not been sufficiently demonstrated, or cannot be adequately evaluated for the Site on the basis of available information, Treatability Studies shall be conducted. The determination regarding the necessity for Treatability Studies shall lie with EPA.

Activity 3.0 Evaluate Treatability Studies (5.4)

Where EPA has determined that Treatability Studies are required, the Respondents and EPA shall decide on the type of Treatability Studies to use (e.g., bench versus pilot). Because of the time required to design, fabricate, and install pilot scale equipment as well as to perform testing for various operating conditions, the decision to perform pilot testing shall be made as early in the process as possible to minimize potential delays of the FS. To assure that a Treatability Study program is completed on time, and with accurate results, the Respondents will submit an amendment to the original RI/FS Scope of Work for EPA review and approval.

Activity 4.0 Treatability Study Deliverables (5.5; 5.6; 5.8)

A Treatability Study Scope of Work Amendment will be prepared and a Final Treatability Study Evaluation will be included in the Draft Feasibility Study Report..

Activity 4.1 Treatability Study Scope of Work Amendment (5.5)

The Respondent will repare a Treatability Study Scope of Work Amendment for EPA review and approval. This Amendment shall describe remedial technologies to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, and residual waste management. The DQOs for Treatability Studies shall be documented as well. If pilot-scale Treatability Studies are to be performed, the Treatability Study Scope of Work Amendment will describe pilot plant installation and start-up, pilot plant operation and maintenance procedures,and operating conditions to be tested. If testing is to be performed off-site, permitting requirements must be addressed.

Activity 4.2 Treatability Study Evaluation Report (5.6)

Following completion of Treatability Studies, the Respondent will analyze and interpret the testing results in a technical report to EPA. This report will be a part of the FS Report. The report shall evaluate each technology's effectiveness, implementability, cost, and actual results as compared with predicted results. The report shall also evaluate full-scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation.

TASK 5 - DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES (RI/FS Guidance, Chapter 4)

The development of Remedial Action Alternatives is performed to select an appropriate range of waste management options to be evaluated. This range of options shall include alternatives in which treatment is used to reduce the toxicity, mobility, or volume of the waste, but varying in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated wastes are managed; alternatives that involve containment and treatment components; alternatives that involve containment with little or notreatment; and a no-action alternative. The following activities shall be performed by the Respondents as a function of the development and screening of Remedial Action Alternatives.

Activity 1.0 Development of Remedial Action Alternatives (4.2)

A range of appropriate waste management options has been identified in the Scope of Work (Task 1, Activity 2) that, at a minimum, ensure protection of human health and the environment and comply with all ARARs.

Activity 1.1 Refine Remedial Action Objectives (4.2.1)

The Respondents shall review and, if necessary, propose refinement to the Site Objectives and preliminary remedial action objectives that were established in the

Scope of Work (Task 1, Activity 2). Any revised Site Objectives or revised remedial action objectives shall be reviewed with EPA. These objectives shall specify the contaminants, exposure pathways and receptors, and an acceptable contaminant level or range of levels (at particular locations for each exposure route.)

Activity 1.2 Develop General Response Actions (4.2.2)

The Respondents shall develop general response actions for groundwater defining containment, treatment, pumping, or other actions, singly or incombination, to satisfy the remedial action objectives.

Activity 1.2 Identify Areas and Volumes of Media (4.2.3)

The Respondent shall identify the extent of groundwater contamination to which general response actions may apply, taking into account requirements for protectiveness as identified in the remedial action objectives. The chemical and physical characterization of the Site and the Baseline Risk Assessment shall also be taken into account.

Activity 1.4 Assemble Remedial Technologies and Alternatives (4.2.4; 4.2.5; 4.2.6)

The Respondent will evaluate technologies applicable to each general response action to eliminate those that cannot be implemented at the Site. General response actions shall be refined to specify remedial technology types. Process options shall be evaluated on the basis of effectiveness, implementability, and cost factors to select and retain one or, if necessary, more representative processes for each technology type. The technology types and process options shall be reviewed with EPA. The reasons for eliminating alternatives must be specified.

The Respondent shall assemble selected representative technologies into alternatives. Together, all of the alternatives shall represent a range of treatment and containment combinations A summary of the assembled alternatives and their related action-specific ARARs shall be reviewed with EPA . The reasons for eliminating alternatives during the preliminary screening process must be specified.

Activity 1.5 Refine Alternatives

The Respondent shall refine the Remedial Action Alternatives to identify contaminant volumes to be addressed by the proposed process and sizing of critical unit operations as necessary. Sufficient information shall be collected for an adequate comparison of alternatives. Remedial action objectives shall also be refined as necessary to incorporate any new risk assessment information presented in EPA's Baseline Risk Assessment Report. Additionally, action-specific ARARs shall be updated as the Remedial Action Alternatives are refined.

Activity 2.0 Alternatives Development Review (4.5)

The Respondent shall review with EPA the work performed and the results of each task above, including an alternatives array summary. These shall be modified by the Respondent if required by EPA to assure identification of a complete and appropriate range of viable alternatives to be considered in the detailed analysis. This review shall cover the

methods, rationale, and results of the alternatives screening process.

TASK 6 - DETAILED ANALYSIS OF REMEDIAL ACTION ALTERNATIVES (RI/FS Guidance, Chapter 6)

The detailed analysis shall be conducted by the Respondents to provide EPA with the information needed to allow for the selection of a remedy for the Site. This analysis is the final task to be performed by the Respondent during the FS.

Activity 1.0 Detailed Analysis of Alternatives (6.2)

The Respondent will conduct a detailed analysis of remaining alternatives. This analysis shall consist of an assessment of each option against a set of nine evaluation criteria and a comparative review of all options using the same nine evaluation criteria as a basis for comparison.

Activity 1.1 Apply Nine Criteria and Document Analysis (6.2.1 - 6.2.4)

The Respondent shall apply nine evaluation criteria to the assembled Remedial Action Alternatives to ensure that the selected Remedial Action Alternative will be protective of human health and the environment; will be in compliance with, or include a waiver of, ARARs; will be cost-effective; will utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable; and will address the statutory preference for treatment as a principal element. The evaluation criteria include: (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume; (5) short-term effectiveness; (6) implementability; (7) cost; (8) State acceptance; and (9) community acceptance. Criteria 8 and 9 are considered after the RI/FS Report has been released to the general public. For each alternative, the Respondents shall provide: (1) a description of the alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative, and (2) a discussion of the individual criterion assessment. Since the Respondent does not have direct input on criteria (8) State acceptance and (9) community acceptance, these will be addressed by EPA after completion of the Draft RI/FS Report.

Activity 1.2 Compare Alternatives Against Each Other and Document the Comparison of Alternatives (6.2.5; 6.2.6)

The Respondent shall perform a comparative analysis among the Remedial Action Alternatives. That is, each alternative shall be compared against the others using the nine evaluation criteria as a basis of comparison. No alternative shall be identified by the Respondent as the preferred alternative in the Feasibility Study. Identification and selection of the preferred alternative is conducted by EPA.

Activity 2.0 Detailed Analysis Deliverables (6.5)

The Respondent shall present the results of the Feasibility Study in a Draft RI/ FS Report for EPA review and comment. This report, as ultimately adopted or amended by EPA, provides a basis for remedy selection by EPA and documents the development and analysis of Remedial Action Alternatives. The Respondent shall refer to the RI/FS Guidance for an outline of the report format and the required report content. The Respondents shall prepare a Final RI/ FS Report which satisfactorily addresses EPA's comments. Once EPA's comments have been addressed by the Respondents to EPA's satisfaction and EPA approval has been obtained or an amendment has been furnished by EPA, the Final RI/ FS Report may be issued.

REFERENCES

The following list, although not comprehensive, comprises manyof the regulations and guidance documents that apply to theRI/FS process:

1. The National Oil and Hazardous Substances Pollution Contingency Plan, March 8, 1990.

2. "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final" U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 9355.3-01.

3. "Interim Guidance on Potentially Responsible Party Participation in Remedial Investigation and Feasibility Studies, U.S. EPA, Office of Waste Programs Enforcement, Appendix A to OSWER Directive No. 9355.3-01.

4. "Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, OSWER Directive No. 9835.3.

5. "A Compendium of Superfund Field Operations Methods," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.

6. "EPA NEIC Policies and Procedures Manual," May 1978, revised November 1984, EPA-330/9-78-001-R.

7. "Data Quality Objectives for Remedial Response Activities," U.S. EPA, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/G-87/003, March 1987, OSWER Directive No. 9335.0-7B.

8. "Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Research and Development, Cincinnati, OH, QAMS-004/80, December 29, 1980.

9. "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans," U.S. EPA, Office of Emergency and Remedial Response, QAMS-005/80, December ,1980

10. "Users Guide to the EPA Contract Laboratory Program," U.S. EPA, Sample Management Office, December 1986.

11. "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements," U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.

12. "CERCLA Compliance with Other Laws Manual," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (Draft), OSWER Directive No. 9234.1-01 and -02.

13. "Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," U.S. EPA, Office of Emergency and Remedial Response, (Draft), OSWER Directive No. 9283.1-2.

14. "Draft Guidance on Preparing Superfund Decision Documents," U.S. EPA, Office of Emergency and Remedial Response, March 1988, OSWER Directive No. 9355.3-02.

15. "Interim Final Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual, Part A," U.S. EPA, Office of Emergency and Remedial Response, EPA/540/9-89/001, September 29, 1989, OSWER Directive No. 9285.7-01a.

16. "Interim Final Risk Assessment Guidance for Superfund - Volume II - Environmental Evaluation Manual," U.S. EPA, Office of Emergency and Remedial Response, EPA/540/1-89/001, March 1989, OSWER Directive No. 9285.7-01.

17. "Superfund Exposure Assessment Manual," U.S. EPA, Office of Emergency and Remedial Response, EPA/540/1-88/001, April 1988, OSWER Directive No. 9285.5-1.

18. "Guidance for Data Useability in Risk Assessment," U.S. EPA, Office of Emergency and Remedial Response, EPA/540/G-90/008, October 1990, OSWER Directive No. 9285.7-05.

19. "Role of the Baseline Risk Assessment In Superfund Remedy Selection Decisions," April 22, 1991, OSWER Directive No. 9355.0-30.

20. "Health and Safety Requirements of Employees Employed in Field Activities," U.S. EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.

21. OSHA Regulations in 29 CFR 1910.120 (Federal Register 45654, December 19, 1986).

22. "Interim Guidance on Administrative Records for Selection of CERCLA Response Actions," U.S. EPA, Office of Waste Programs Enforcement, March 1, 1989, OSWER Directive No. 9833.3A.

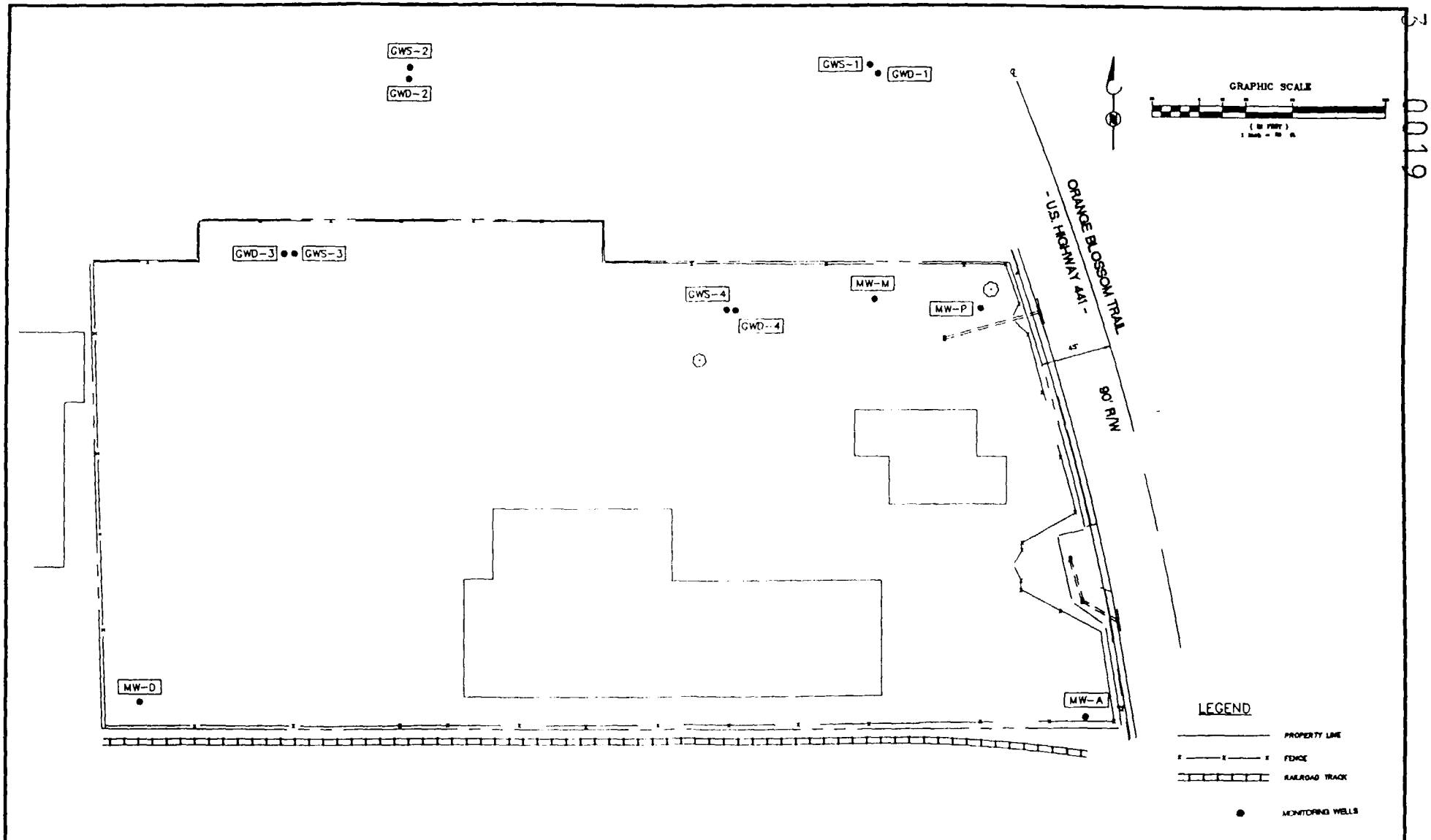
23. "Community Relations in Superfund: A Handbook," U.S. EPA, Office of Emergency and Remedial Response, June 1988, OSWER Directive No. 9230.0-3B.

24. "Community Relations During Enforcement Activities And Development of the Administrative Record," U.S. EPA, Office of Waste Programs Enforcement, November 1988, OSWER Directive No. 9836.0-1A.

25. "Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual", U.S. EPA Region IV, Environmental Services Division, February 1, 1991 (revised periodically).

26. "US EPA Contract Laboratory Program Statement of Work for Organics Analysis", U.S. EPA, Office of Emergency and Remedial Response, OLM01.1-8, March, 1991.

27. "US EPA Contract Laboratory Program Statement of Work for Inorganics Analysis", U.S. EPA, Office of Emergency and Remedial Response, ILM02.-, March 1991.



Note: Building locations shown for reference only.

FIGURE 1 Existing Wells As of September 1992

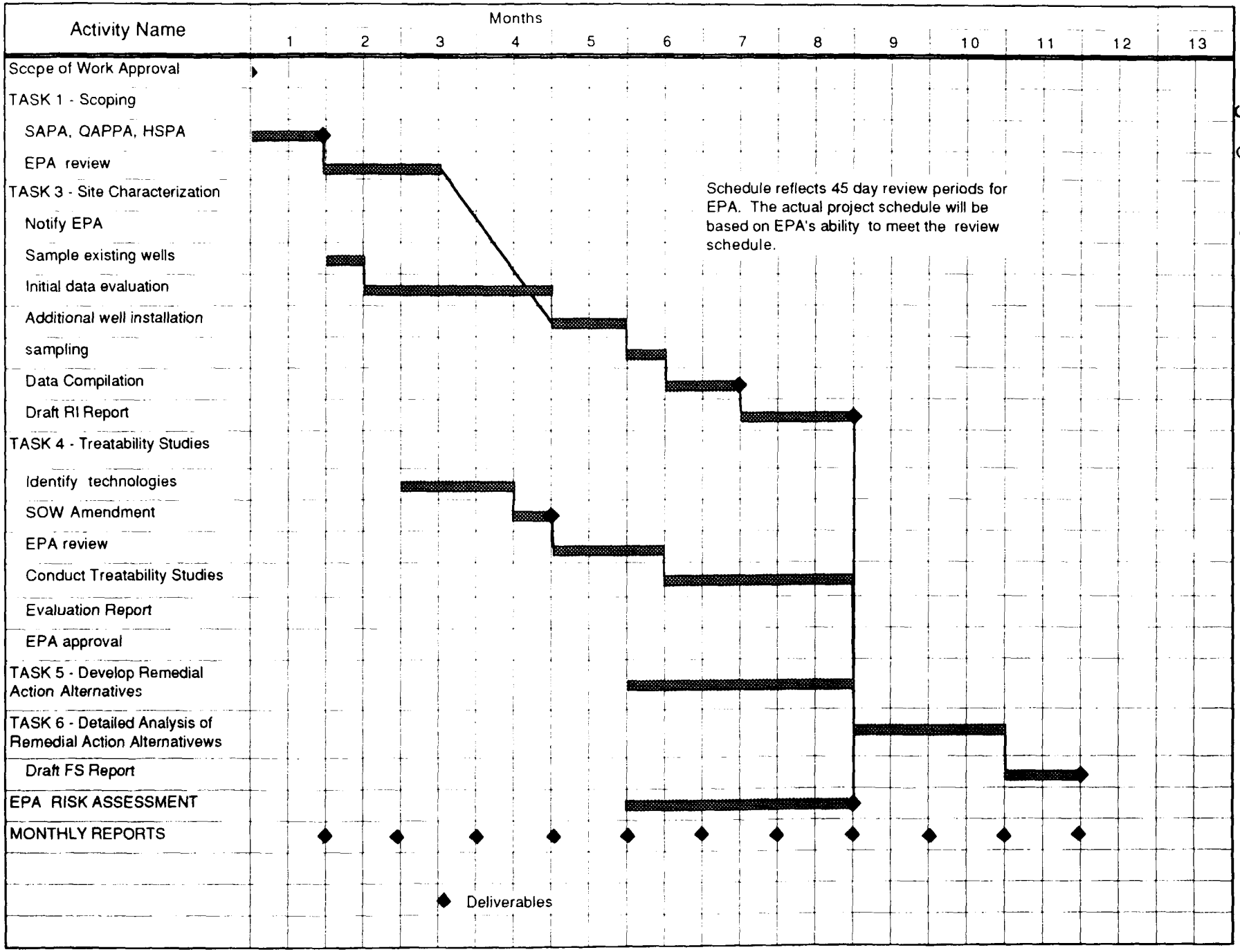
ATTACHMENT A

SUMMARY OF THE MAJOR DELIVERABLES FOR THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY AT THE CHEVRON CHEMICAL COMPANY ORLANDO SITE

TASK	DELIVERABLE	EPA RESPONSE
PROJECT PLANNING		
-	Sampling and Analysis Plan Amendment (5)	Review and Approve
-	Quality Assurance Project Plan Amendment (5)	Review and Approve
-	Site Health and Safety Plan Amendment (5)	Review and Comment
TREATABILITY STUDIES		
-	Treatability Study Scope of Work Amendment (5)	Review and Approve
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY		
-	RI Data Compilation (5)	Review and Comment
-	Remedial Investigation/ (RI/FS) Report (5)	Review and Approve
-	Feasibility Study (RI/FS) Report (5)	Review and Approve

Note: The number in parenthesis indicates the number of copies to be submitted by Respondents. One copy shall be unbound, the remainder shall be bound. Also, see the Administrative Order on Consent for additional reporting requirements and further instructions on submittal and dispositions of deliverables.

Attachment B **RI/FS Schedule** **Chevron Chemical Company Orlando Site**



ATTACHMENT C

CHEVRON CHEMICAL COMPANY ORLANDO SITE REMOVAL ACTION GROUNDWATER ARARS

Compound	MCL (ug/l)
Arsenic, Total	50
Benzene	1
Lindane (g-BHC)	0.2
Chlorobenzene	100
Chromium, Total	100
1,1-Dichloroethene	7
Endrin	0.2
Ethylbenzene	100
Heptachlo;	0.4
Methylene Chloride	5
Toluene	1,000
1,1,2-Trichloroethane	5
Xylenes, Total	10,000
Zinc, Total	2*
1,2-Dichlorobenzene	600
1,4-Dichlorobenzene	75
1,2-Dichloroethane	3
1,2-Dichloropropane	5
Cadmium, Total	5
2,4,5-TP	10
2,4-D	70
Lead, Total	15**
Carbon Tetrachloride	3
Chlordane	2
Ethylene Dibromide	0.02
1,1,1-Trichloroethane	200
Tetrachloroethene	3
Heptachlor Epoxide	0.2
Toxaphene	3
1,1,2-Trichloroethylene	3
Methoxychlor	40
4,4'DDD	0.4*
4,4'DDE	0.3*
4,4'DDT	0.3*
Alderin	0.005*
Dieldrin	0.001*
Endosulfan I	0.4*

* PRG: Preliminary Remediation Goal used whenever an MCLG, MCL or other health-based number does not exist. This goal is a preliminary estimate calculated on human health considerations only. It will be evaluated and possibly revised based on the results of the risk assessment and available EPA analytical methodology.

** TT: Treatment Technique used for lead as the action level at NPL sites due to the MCLG of 0.